

INTRODUCTION

In the late 1950s a small group of young Japanese architects and designers joined forces under the title of "Metabolism". Their visions for cities of the future inhabited by a mass society were characterized by large scale, flexible, and expandable structures that evoked the processes of organic growth. In their view, the traditional laws of fixed form and function were obsolete. Metabolism arose in post-World War II Japan, and so much of the work produced by the movement is primarily concerned with housing issues.



Figure1. A composition of different metabolism movement buildings

WHAT IS METABOLISM?

"Changeability and Flexibility were the key elements that the Metabolist Group Seized upon and explored.

Metabolism, as we know it, is the biological process by which life is maintained through the continuous cycle of producing and destroying protoplasm.

To the Japanese architects who adopted the name, it meant creating a dynamic environment that could live and grow by discarding its outdated parts and regenerating newer, more viable elements".

To develop a building system that "could cope with the problems of our rapidly changing society, and at the same time maintain stabilized human lives" Noboru Kawazoe, "From Metabolism to Metapolis-Proposal for the City of the Future," in *Urban Structures for the Future*, by Justus Dahinden, Praeger Publishers, New York, 1972

IDEOLOGY

The ideas of Metabolism as implemented in modern culture were philosophical as well as architectural, and ostensibly based on Buddhist notions of impermanence and change. Changeability and Flexibility were the key elements that the Metabolist Group Seized upon and explored.

METABOLISM IN ARCHITECTURE

If architecture is used as a meta-organism. Metabolism in architecture is a processes that occur within the architecture to maintain and sustain it.

There are three levels of metabolism to consider for architecture in the urban environment.

- MACRO LEVEL
- MESO LEVEL
- MICRO LEVEL

Metabolism

MACRO LEVEL IN METABOLISM

The city's infrastructure is viewed as its vascular system which transports urban nutrients from one place to another.

In this vascular system,	
water and gas	pipelines
electricity	cables and wires
food and materials	roadways and railways
people	vehicles

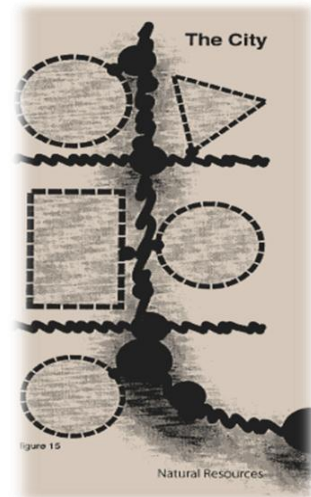


Figure2

Figure2. Diagram showing the macro or the city scale or the meso or the architectural scale depicting conceptually how that project works in that scale

MESO LEVEL IN METABOLISM

At meso level metabolism occurs within the architecture. Architecture is reliant upon people to sustain it. The architecture also takes in resources, such as water and energy, which prevents deterioration of the physical structure and maintain interior environment.

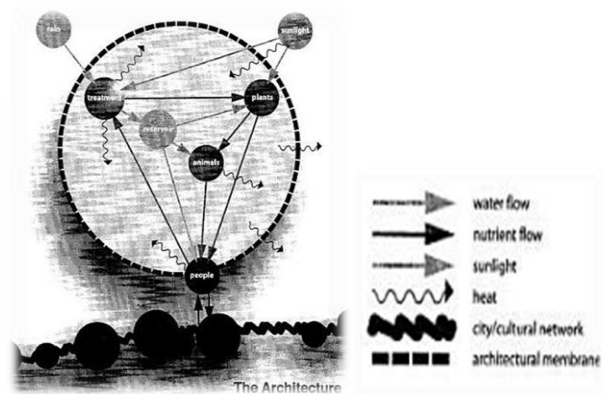


Figure3

MICRO LEVEL IN METABOLISM

The micro level metabolism seeks to strengthen the relationship between humans and architecture in which they dwell, by providing not only shelter, but food and water also as well. The architecture will do this while maintaining the macro, meso and micro relationships.

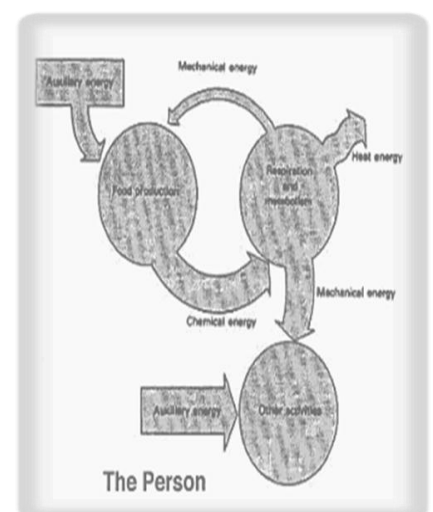


Figure4. Diagram showing macro human scale & how it interact with energy at that scale

WHO ARE THE METABOLISTS?

From the family tree (developed by Michael Franklin Ross, AIA) in this book The Five young designers during 1960, who has combined their diverse, futurists urban context were: **Kisho Kurokawa, Fumihiko Maki, Masato Otaka, Kiyonori Kikutake, and Noboru Kawazoe**. These young designers consist of four Architects and one architectural journalist.

Kenzo Tange

Kenzo Tange(*fig5*) was a Japanese architect, and winner of the 1987 Pritzker Prize for architecture. He was one of the most significant architects of the 20th century, combining traditional Japanese styles with modernism, and designed major buildings on five continents. Tange was also an influential protagonist of the structuralism movement.

Influenced from an early age by the Swiss modernist, Le Corbusier, Tange gained international recognition in 1949 when he won the competition for the design of Hiroshima Peace Memorial Park. Joining the group of architects known as Team X in the late 1950s he steered



Figure5. Architect Kenzo Tange

Yona Friedman

Yona Friedman (born 5 June 1923,) is a Hungarian-born French architect, urban planner and designer. He became famous in the late fifties and early sixties, in the so-called age of mega structures.

In 1958, Yona Friedman published his first manifesto : "Mobile architecture". It described a new kind of mobility not of the buildings, but for the inhabitants, who are given a new freedom.

Mobile architecture is the "dwelling decided on by the occupant" by way of "infrastructures that are neither determined nor determining". Mobile architecture embodies an architecture available for a "mobile society". To deal with it, the classical architect invented "the Average Man". The projects of architects in the 1950s were undertaken, according to Friedman, to meet the needs of this make-believe entity, and not as an attempt to meet the needs of the actual members of this mobile society. The teaching of architecture was largely responsible for the "classical" architect's under-estimation of the role of the user. Furthermore this teaching did not embrace any real theory of architecture. Friedman proposed then teaching manuals for the fundamentals of architecture for the general public.

The spatial city, which is a materialization of this theory, makes it possible for everyone to develop his or her own hypothesis. This is why, in the mobile city, buildings should :

- touch the ground over a minimum area

- be capable of being dismantled and moved

- and be alterable as required by the individual occupant.

Famous projects examples

Nakagin Capsule Tower

The **Nakagin Capsule Tower**(fig.6&7) is a mixed-use residential and office tower designed by architect Kisho Kurokawa and located in Shimbashi, Tokyo, Japan.

Completed in 1972, the building is a rare built example of Japanese Metabolism, a movement that became emblematic of Japan's post-war cultural resurgence. The building was the world's first example of capsule architecture built for actual use.

The building is still in use as of 2010, but has fallen into disrepair.

Ideology

This style was intended to create structures that were thought of as a tree- a permanent element, with the dwelling units as leaves- temporary elements which fall down and are renewed according to the needs of the moment. The buildings can grow within this structure and die and grow again- but the structure remains .

The structure within Kurokawa's tree is not the problem- but the leaves themselves. Outmoded, these machines for living hang on. Contrary to the metabolist mantra, they were never regenerated. They are all in their autumnal state with no new buds to take their place.

Recent updates

On April 15, 2007, the building's residents, voted to demolish the building and replace it with a much larger, more modern tower. In the interest of preserving his design, Kurokawa proposed taking advantage of the flexible design by "unplugging" the existing boxes and replacing them with updated units, a plan supported by the major architectural associations of Japan, including the Japan Institute of Architects. A developer for the replacement has yet to be found, partly because of the late-2000s recession.



Figure6.



Figure7.A
sample
room
within the
Nakagin
Capsule
Tower



Figure7.

Habitat 67



Figure8. Habitat 67 view from port

Habitat 67 is a housing complex and landmark located on the Marc-Drouin Quay on the Saint Lawrence River at 2600, Pierre Dupuy Avenue in Montreal, Quebec, Canada. Its design was created by architect Moshe Safdie based on his master's thesis at McGill University and built as part of Expo 67.

Expo 67 was nicknamed "Man and his World", taken from Antoine de Saint Exupéry's memoir *Terre des hommes* (literally "Land of Men"), translated as *Wind, Sand and Stars*. Housing was one of the main themes of Expo 67. Habitat 67 then became a thematic pavilion visited by thousands of visitors who came from around the world. During Expo 67 it was also the temporary residence of the many dignitaries coming to Montreal.



Figure8.

It was designed to integrate the variety and diversity of scattered private homes with the economics and density of a modern apartment building. Modular, interlocking concrete forms define the space. The project was designed to create affordable housing with close but private quarters, each equipped with a garden. The building was believed to illustrate the new lifestyle people would live in increasingly crowded cities around the world. The complex was originally meant to be vastly larger. Due to its architectural cachet, demand for the building's units has made them more expensive than originally envisioned.

The building is owned by its tenants, who formed a limited partnership that purchased the building from the Canada Mortgage and Housing Corporation in 1985.



Figure9.



Conceptual project examples

Clusters In The Air

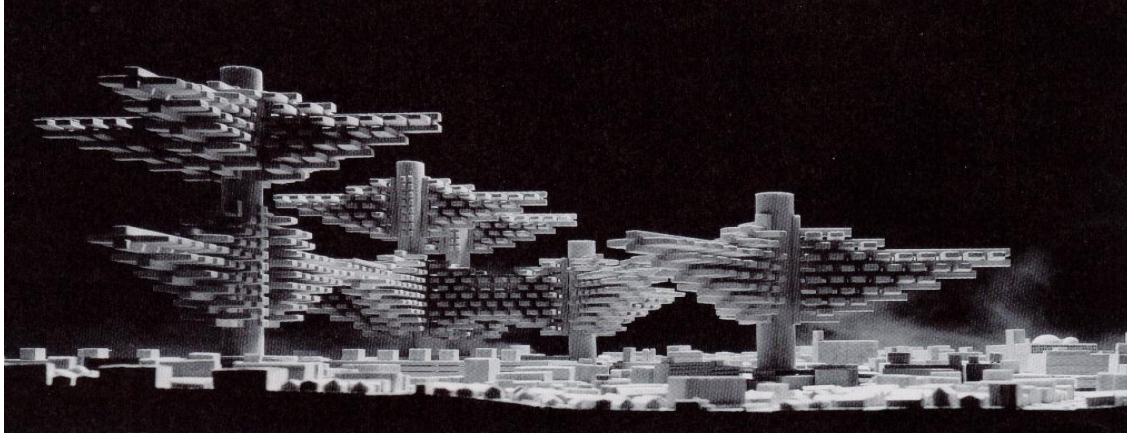


Figure10.

Arata Isozaki a metabolist architect deigned Clusters in the Air(*fig.10*) in 1960-62 for Tokyo. He uses the same joint core system as he did for the City in the Air. The concept of the clusters was to develop a new way to structure housing around Tokyo. The Cluster are supposed to represent leaves from trees which are the housing units and the core represents the trunk of the tree.

Kisho Kurokawa's Helix City (Floating City)

Helix city(*fig11*) plan was designed by Kisho Kurokawa in 1961 during the early years of the metabolism movement. The city is more commonly known as the floating city because it is placed on the ocean. Kurokawa's vision for the city was to have an organic city plan, having the land and water building structures to be connected only by bridges. The form of the spiral structures resembles DNA. The apartments in the structure are hung within the spiral to fill the spaces.

Design Concept

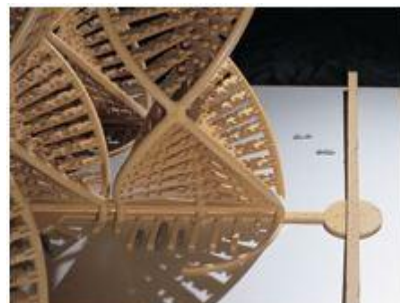
Here, urban structures are being developed both vertically and horizontally, and the points of contact are not conscious.

The helix structure(*fig11*) is a spiral structure which has been proposed as a third or alternate spatial system for such urban space. Just as in the case of the chromosomes (DNA) in the life system, the helix structure acts as a space frame for data transmission.

This structure is in the form of a three-dimensional cluster system.



Figure11.



Agricultural City



Figure12.

Design:1960

Design Concept

Natural growth of the agricultural city(*fig12&13*) is provided by a grid system of streets containing the utility pipes underneath. While each of the square units composed of several households is autonomous, linking these units together creates a village. The living units multiply spontaneously without any hierarchy, gradually bringing the village into being as the traditional rural settlement has developed throughout Japanese history.

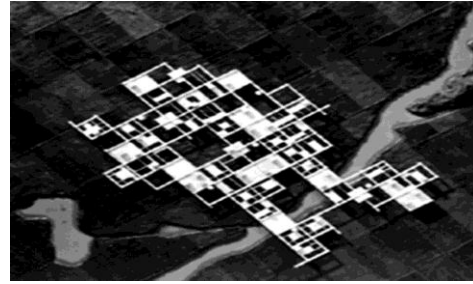


Figure13.

Floating City, Kasumigaura

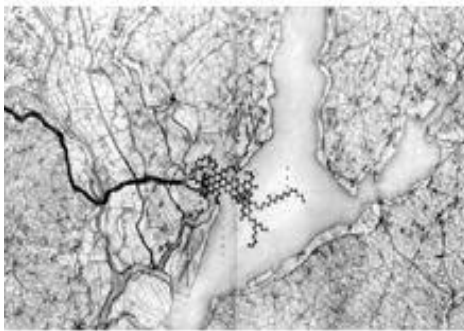


Figure14.

Ibaraki, Japan

Design: 1961

Design Concept

This project was prepared as a housing project to be built on the surface of a lake in connection with planning of the New Tokyo International Airport in Narita.

Vertical separation of vehicular and pedestrian traffic, on the roofs of the structure, is provided: the motorways and walks from a transport system which interconnects the structures of the city. A harbour is provided at each unit for use by surface crafts. A spiral escalator system provides a means of vertical transportation between the rooftop and lake transport systems.

Each home owner is free to use whatever building materials preferred when constructing their homes on manmade land which has a spiral configuration and is provided with terraces.

A city is expressed by residences.

The structure of the city must be planned by multiplanar transport system which is centered on activities of daily life. In particular, the spiral system, or the helix structure, will probably bring a third order to urban space.

The unity-space helix is the prototype of a city(*fig14&15*) with three-dimensional growth potential.

This was the prototype of the Helix Plan prepared for the second publication issued by the Metabolism Group.



Figure15.

Graphic Arts Centre by Paul Rudolph

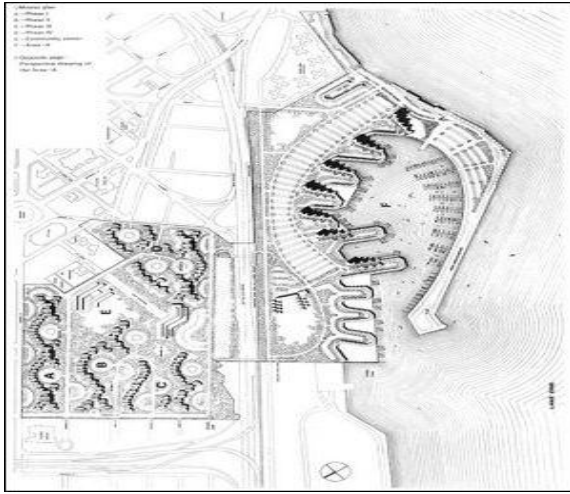


Figure16



Figure17

Perhaps his most famous Metabolist-like proposals are for the Lower Manhattan Expressway Aka Lomex (*fig18*) and the Graphic Arts Center (*fig17*). Both of these proposals were mega-structures which straddled the city beneath. By building structures where buildings weren't supposed to go i.e. on the grid lines themselves and not within the grid, Rudolph created serpentine armatures to install his prefabricated "20th Century Brick"s of modular houses. Growing, aggregating and reorganizing, these proposals were largely D.O.A. but provide a fantastic insight to the further densification of the city, one perhaps future generations will come to realize.

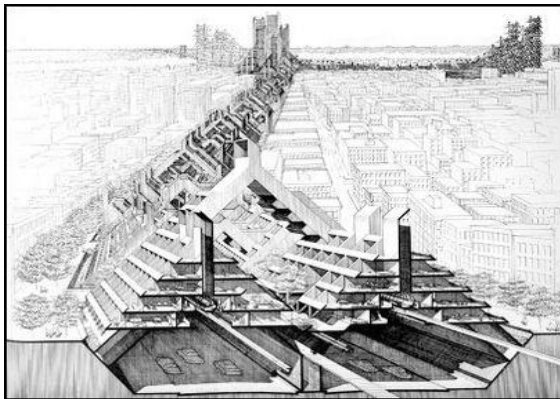


Figure18

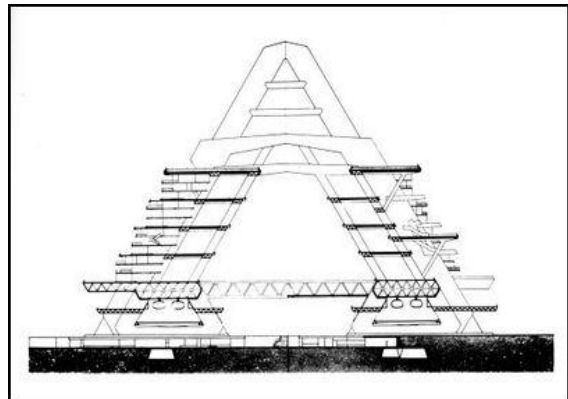


Figure19

In viewing these one cannot help but recall Kenzo Tange's design studio at Harvard when he brought Metabolism to Massachusetts (*fig19*).

The similarities are more than coincidence. If Tange's proposal were built, it would have transformed the Harbor and extended the valuable waterfront views to the masses.

If Rudolph's got built, they would perhaps be his most recognizable structures, and the most protected from demolition as by their very construction, they would call for reorganization and constant change "preservation via evolution".

Metabolism

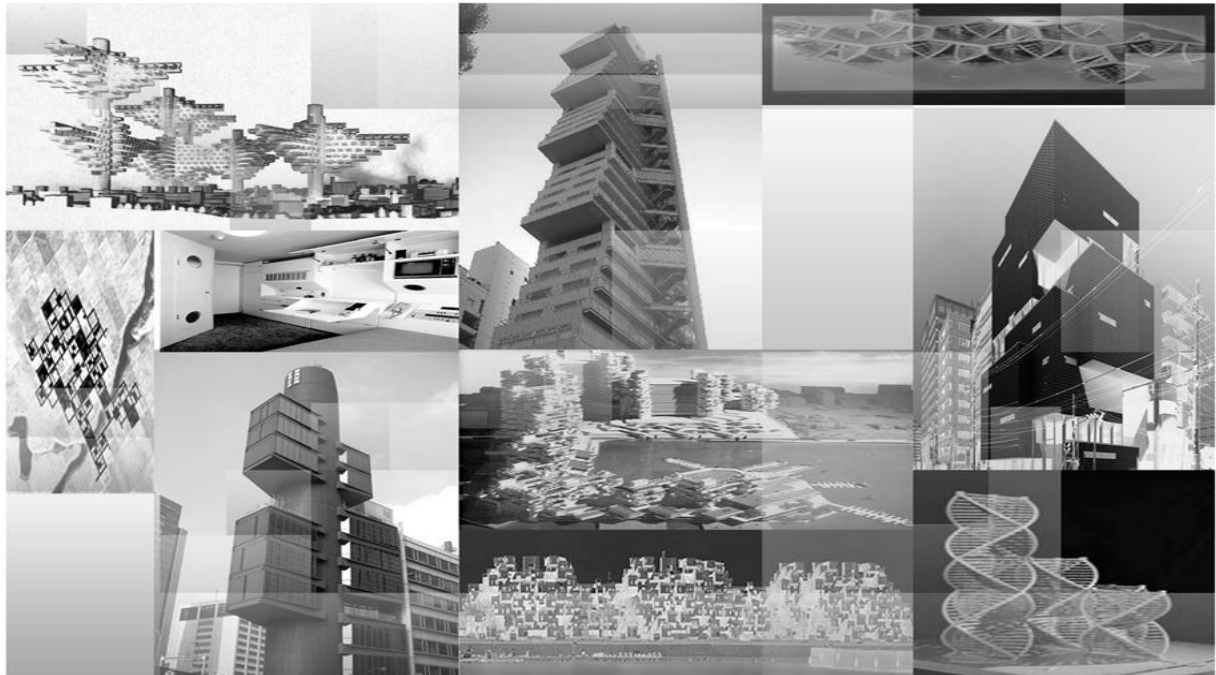


Figure20. A composition of different metabolism movement buildings

Conclusion

This movement came into action to help human kind in very peak on urbanisation and helping problems of housing after II World War especially in Japan. The Metabolist thought it would help the world in same context.

It aimed at to develop a building system that “could cope with the problems of our rapidly changing society, and at the same time maintain stabilized human lives” Noboru Kawazoe,” (From Metabolism to Metapolis-Proposal for the City of the Future,)”

This movement somehow achieved its target and dissolved like other movements in architecture, but still its comes in picture in many project giving us idea of futuristic building with movable units.

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